

**Bonneville Power Administration
Fish and Wildlife Program FY99 Proposal Form**

Section 1. General administrative information

Idaho Fish Screening Improvement - O&M

Bonneville project number, if an ongoing project 9401500

Business name of agency, institution or organization requesting funding
Idaho Department of Fish and Game

Business acronym (if appropriate) IDFG

Proposal contact person or principal investigator:

Name	Patrick Marcuson
Mailing Address	Box 1336
City, ST Zip	Salmon, ID 83467-1336
Phone	(208)756-6022
Fax	(208)756-6274
Email address	None

Subcontractors. List one subcontractor per row; to add more rows, press Alt-Insert from within this table

Organization	Mailing Address	City, ST Zip	Contact Name
Blaine S&W Cons. District	Box 1300	Hailey, ID 83333	Gale Roberts
Lemhi S&W Cons. District	201 N. Church	Salmon, ID 83467	Katie Salvin
Custer S&W Cons. District	Box 305	Challis, ID 83226	Karma Bragg
Civil Contractors	As Awarded		

NPPC Program Measure Number(s) which this project addresses.

7:10A1, 7:10A2, 7:10A3, 7:10A4, 7:10A5, 7:10A6, 7:10A7

NMFS Biological Opinion Number(s) which this project addresses.

None

Other planning document references.

If the project type is “Watershed” (see Section 2), reference any demonstrable support from affected agencies, tribes, local watershed groups, and public and/or private landowners, and cite available documentation.

Salmon Summit, NPPC Strategy for Salmon Recovery, NMFS Salmon Recovery Plan, State of Idaho Statutes, Congressional Mitchell Act, USFS Land Use Plans for Challis and Salmon NF.

Subbasin.

Snake, Salmon, Clearwater

Short description.

Enhance passage of juvenile and adult fish in Idaho’s Anadromous fish corridors by consolidation and elimination of irrigation diversions. Minimize impact of irrigation diversion dams, screen pump intakes and screen all irrigation canals. Reconnect tributaries lost to irrigation canals. This is a high priority ESA effort as directed by all salmon recovery strategies.

Section 2. Key words

Mark	Programmatic Categories	Mark	Activities	Mark	Project Types
x	Anadromous fish	x	Construction	x	Watershed
*	Resident fish	*	O & M		Biodiversity/genetics
	Wildlife		Production		Population dynamics
	Oceans/estuaries		Research		Ecosystems
	Climate	*	Monitoring/eval.	*	Flow/survival
	Other		Resource mgmt		Fish disease
			Planning/admin.		Supplementation
			Enforcement	*	Wildlife habitat en-
		*	Acquisitions		hancement/restoration

Other keywords.

Fish screens, ditch consolidations, ditch eliminations

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship
9401700	Idaho Model Watershed Habitat	Joint projects
9202603	Idaho Model Watershed Admin/Improvement	Technical Work group advise/priorities
9107200	Redfish Lake sockeye	Keep sockeye smolts from diversions
9600700	Consolidation Program	Essential joint projects

8909800	Idaho Supplementation Studies	Smolt/fry movement v.s. screen efficiencies
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Section 4. Objectives, tasks and schedules

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Complete surveys, designs, construction and installations of all unscreened, obsolete gravity and pump intakes in Idaho's Anadromous fish corridors	a. b. c. d. e.	Complete topographic surveys of unscreened and obsolete fish screen sites Design appropriate fish screen headgate and fish friendly diversion at each site. Contract construction at each site Fabricate and install fish screen and associated components at each site. Locate, measure, design, build and install fish screens on pump intakes.
2	Reduce the number of gravel push-up diversion dams by consolidation and elimination of irrigation ditches	a. b. c. d. e.	Identify potential consolidation and ditch elimination sites. Attain easements and flow agreements. Design consolidations and replacement of surface water diversions to ground water systems. Construct designs both by contract and IDFG crew. Evaluate and adjust as needed for proper function
3.	Maximize any rearing habitat in appropriate irrigation canals	a. b.	Evaluate ditch fish habitat potential and existing fishery Locate fish screen to maximize rearing habitat
4.	Reconnect streams to anadromous fish corridors	a. b. c.	Locate streams providing historic spawning and rearing for anadromous fish Determine if adequate water attracts anadromous fish Design and implement reconnect

		d.	Install fish screens where needed
5.	Install and evaluate alternative fish screens	a. b.	Look for sites for infiltration and other simpler means of saving fish from irrigation practices. Install and evaluate new, cheaper alternative screens.
6.	Make accessible fish screens safer to humans and domestic pets	a.	Fence accessible screen sites

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1.	01/1999	12/1999	37
2.	01/1999	12/1999	46
3.	05/1999	10/1999	1
4.	05/1999	12/1999	20
5.	01/1999	12/1999	5
6.	06/1999	10/1999	1

Schedule constraints.

Some proposed consolidations and eliminations fail at last hour because one or more ditch owners cannot agree

Completion date.

2005

Section 5. Budget

FY99 budget by line item

Item	Note	FY99
Personnel		0
Fringe benefits		0
Supplies, materials, non-expendable property		120,000
Operations & maintenance		0
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		500,000
PIT tags	# of tags:	0
Travel		0
Indirect costs		25,560

Subcontracts		350,000
Other		4,440
TOTAL		1,000,000

Outyear costs

Outyear costs	FY2000	FY01	FY02	FY03
Total budget	1,000,000	1,000,000	500,000	500,000
O&M as % of total	0	0	0	0

Section 6. Abstract

Fish screens across irrigation canals were started as a high priority ESA effort to improve existing screens, unscreened, canals, and improve fish passage in Idaho tributaries with threatened or endangered species impacts. Consolidation and/or elimination of numerous diversions is the best solution to maximizing fish survival. Reconnecting streams lost to irrigation, opens up many miles of spawning and rearing habitat. Elimination or modification of gravel push-up diversions to fish friendly diversions saves fish, reduces stream instability and improves chemical, physical and biological characteristics of Idaho waterways.

Idaho is about 70% completed with the screening effort. Consistent funding could assist completing the work by 2005. Evaluations are on-going using separate funding sources.

Section 7. Project description

a. Technical and/or scientific background.

The fish screen program is a “do-it” activity. It is not a research or management action. All the technical aspects are formulated by the Fish Screen Oversight Committee comprised of each State, BPA and NMFS contract officers and engineers. The fish screen criteria generated by this committee were formed from the best available evaluations, literature review and engineering standards (see NMFS fish screen criteria). The fish screen programs are directed by Salmon Summit, NPPC Strategy for Salmon Recovery, NMFS Recovery Plan, Idaho State Statutes and Congressional appropriations of the Mitchell Act. NMFS has an informal consultation under Section 7(a)(2) of the ESA and a biological assessment relative to all fish screening and adult fishways funded under the Mitchell Act, “The programs under this act are not likely to adversely affect the listed salmon”.

Idaho’s fish screen program consults other fisheries managers, researchers and Model Watershed to evaluate each screen project. A set of biological questions are examined before each screen is constructed.

b. Proposal objectives.

1. Complete surveys, designs, construction and installations of all unscreened, obsolete gravity and pump intakes in Idaho's Anadromous fish corridors.
2. Reduce the number of gravel push-up diversion dams by consolidation and elimination of irrigation ditches.
3. Maximize any rearing habitat in appropriate irrigation canals.
4. Reconnect streams to Anadromous fish corridors.
5. Install and evaluate alternative fish screens.
6. Make accessible fish screens safer to humans and domestic pets.

Objective 1 goal is to accomplish 30 to 50 screen projects annually until each irrigation diversion is screened to prevent fish loss. IDFG has pre-topographic surveys on all the main Anadromous fish corridors. As Objective 4 continues (three reconnects are in progress and two others have been identified) more surveys will be required in these reconnected tributaries. The analysis of fish populations (Objective 5) in irrigation canals is on-going pending sufficient funds. This allows the program to seek the best location of the fish screen to maximize any rearing area available in the canals, Objective 3.

Reducing the number of gravel push-up diversion dams, Objective 2, is accomplished by consolidation and elimination of ditches. The Department of Fish and Game also has made seven old diversions fish friendly and continues to look for diversions blocking spawning migrations and diverting entire smolt out-migrations through screen by-pass pipes. Only two fish screens remain to be fenced to restrict young humans. All new screens viewed as a threat will be fenced as needed.

c. Rationale and significance to Regional Programs.

The screen program in Idaho and other Columbia River States has been recognized as a positive value to protecting both anadromous and resident fish. In 1956, Gebhards found an annual loss of one (1) million smolts to 250 diversions in 500 miles of the Salmon River drainage.

In 1961, Corley estimated 279,000 smolts were saved by 84 fish screens on the Lemhi River. Munther, 1973, found 3,260 chinook juveniles diverted into one unscreened ditch in the Sawtooth valley. Kiefer, 1994, researched one Salmon River diversion (S-28) and found 68% of the down river migrants were funneled into this ditch. Present ongoing studies reveal some wing dams take all migrants, others on outside meanders divert most

of the downstream migrants. The loss of game fish are not restricted to Anadromous species, Clothier, 1954 and Spindler, 1955 emphasized the loss of resident fish in Montana years ago.

This proposal relates directly to USBR project (SBT 9600700) which combines consolidation of large mainstream diversions with IDFG screen program. Red Fish Lake sockeye (9107200) releases need the IDFG screen program to minimize migration problems in Idaho. Other supplementaton efforts in Idaho waters (8909800) need the protection of fish screens. Lands placed into Conservation Agreements (9401700) eliminate the need for numerous ditches, help stabilize stream channels and provide the very best protective measures for fish. The limiting factor is the major dams blocking and disrupting Anadromous fish returns to Idaho. Evaluations of various screen configurations are well documented. Abernethy, et.al. 1996, has used BPA funds to study physical impacts of screens on juvenile fish.

d. Project history

The BPA title Upper Salmon Anadromous Fish Passage (NPPC Title: Idaho Fish Screening Improvement) started in 1993 to construct and equip a fish screen shop in Salmon, Idaho. This was a joint project with Mitchell Act funds administered by NMFS.

This was originally set-up as a 5 year, 5 phase program. It has been modified several times by BPA because of various funding levels and contract period changes. In 1994, \$749,716 budget assisted with purchase of equipment and started assisting the Mitchell Act fish screen objectives. No additional grant awards were made until FY97. This award was \$701,000 of the \$1,000,000 requested. The FY98 request of \$1,000,000 was awarded at \$800,000 for contract calendar year of 1998.

<u>FY</u>	<u>BPA Contract Award #</u>	<u>Amount Awarded</u>	<u>Purpose</u>	
1993	DE-FG79-92BP84362341,978		Shop&Equipment	1993
1994	94FG14031	749,716	Equipment&Screen	
1997	94FG14031	701,000	Screen Projects	
1998	94FG14031	800,000	Screen Projects	

Project results are published monthly through 1994, quarterly and annually from 1995 through present. Additional reports include CBFWA - Fish Screen Oversight's tri-state report and NMFS Report to Congress.

Major Results:

Program has 8,000 square foot shop with specific use tools, construction equipment and engineering support to survey, design and construction contracting of all projects relating to the screen program.

BPA/MA funds reconstructed 160 of 240 screens to NMFS criteria, consolidated 12

ditches into 5 canals, eliminated 4 ditches for ground water systems (one elimination by conservation agreement), 4 infiltration delivery systems, 24 pump intake screens, one fish ladder, 10 headgates to restrict fish entry, 4 fish friendly diversion dams, 14 protective fences, evaluation of canals as fish rearing habitat and providing access to screen sites.

e. Methods.

The following describes the course of action for screening an irrigation canal, consolidation of ditches, replacing a diversion that blocks migration of fish and improving the conveyance flows of some inefficient ditches. Replacing or installing screens on pump intakes requires an agreement (IDFG file) with each irrigator. Headgate agreements (IDFG file) also require a signed agreement and a cost share by the irrigators.

Course of Action for Screening on Private and Public Property

1. Annual selection of 40-50 sites (pending funding level) by a technical work group of agencies and interested irrigators. This is usually done in conjunction with Idaho Model Watershed.
2. Educational and informative newsletters to all irrigators and affected agencies in the drainages of the 40-50 sites. ^{1/}
3. Determine landownership of screen site, point of diversion, access route for construction and for routine maintenance, and bypass route.
4. Secure or verify easement for access to screen sites not on properties being irrigated.
5. Secure flow agreements and secure or verify access easements with water users.
6. Secure headgate agreement from water users.
7. Visit site with IDFG biologist, IDWR representative, landowner(s) and irrigator(s) prior to site survey to discuss current operations, problems, and study fisheries issues.
8. Complete topographic surveys of sites including preliminary screen sizing and site location(s).
9. Estimate ditch flow volume from survey and other available flow measurements.
10. Secure permits, water right transfers for point of diversion relocations. (404, highway right-of-way, SUP., NEPA/EA's/etc.)
11. Design site installation cooperating with NRCS on headgate designs.
12. Review installation design with: landowners, irrigators, Model Watershed, permitting agencies, ShoBan Tribe, IDFG fisheries, and NMFS.
13. Package contract and bid.
14. Award Contract.
15. Shop materials and equipment submitted for bids.
16. Provide construction access.
17. Contractor construction and IDFG inspection.
18. Prepare site punch list with landowner, contractor and IDFG crew.
19. Contract closeout.
20. Prepare as-built drawings and show actual bypass pipe locations.
21. Fabricate screen and associated metal work in shop.

22. Idaho Fish and Game installation/construction; screen and metal installation, ditch and diversion modifications.
23. Headgate fabrication - irrigator's installation, site restoration, demolition and/or restoration of old screens, etc.
24. Final product inspection and preparations for use.
25. Idaho Fish and Game operates and maintains screens as funds allow. Irrigators operate and maintain headgates, diversions and conveyance systems.

1/ Newsletters explain how screens work, state statutes, how sites are selected each year, funding restrictions, water rights, benefits of screening to irrigators, etc. Idaho Department of Water Resources will mail out preliminary letters describing State Statutes for headgates.

Footnote: Many modifications to this general procedure outline can and do occur. Improper functioning facilities require corrective action. Special fish habitat, and alternative screens usually require a special course of action. Other department activities consume $\pm 20\%$ of employee time.

The rate of progress often depends on IDFG's success at getting signed flow agreements, easement for access, weather during spring and fall construction, securing permits, and consistent funding. Each screen project has a lengthy pre-construction process.

f. Facilities and equipment.

Idaho Fish and Game has the facilities and equipment to complete all tasks. Occasional unexpected breakdowns require capital expenditures.

BPA and NMFS funded a new 8,000 square foot shop in Salmon, Idaho in 1993 to fabricate fish screens and related appurtenances. The shop was equipped with tools through generous funding by BPA and NMFS. Specific use tools and equipment include cold cut saw, band saw, plasma cutter, ironworker, sheet metal shear, power plate roller, profile roller, paint booth, abrasive blast machine, overhead crane, and MIG/TIG welders.

The Idaho Screen Program also has some various construction equipment used to install screens, headgates, fish passage ways, and support for riparian habitat improvements. This fleet consists of four dump trucks, dozer, 3/4 yard track excavator, front end loader, rubber tired backhoe, grader, rough terrain forklift, boom truck, and two utility service trucks. This equipment is used for small projects that would be too costly to bid out to private contractors and for routine maintenance of facilities.

IDF&G relies heavily on the private sector to construct medium and large scale projects. All concrete construction is performed by outside contractors. Some specialized equipment is used so infrequently that it is not practical to own by the program. Items of this nature would include concrete cutting machines and lowboy tractor-trailer transports.

All concrete cutting needs are satisfied by hiring firms from the private sector. Heavy equipment such as the road grader is transported by commercial carrier. There are many contractors in the area that can provide equipment and manpower for any large project requiring heavy equipment, heavy hauling, concrete pumping, blasting, and material screening.

The screen program also has engineering support equipment such as a total station survey system and data downloading interface to computers. This equipment allows our engineering staff to survey, design, and perform construction contracting of all projects relating to the screen program.

g. References.

Abernethy, C.S., D.A. Neitzel, and W. V. Mavros. 1996. Movement and Injury Rates for Three Life Stages of Spring Chinook Salmon *Oncorhynchus tshawytscha*: A comparison of Submerged Orifices and an Overflow Weir for Fish Bypass in a Modular Rotary Drum Fish Screen. Prepared by the Pacific Northwest National Laboratory for the Division of Fish and Wildlife, Bonneville Power Administration, Portland, Oregon.

Clothier, William D., 1954. Effect of water reductions on fish movement in irrigation diversions. *Journal Wildlife Mgt.*, Apr. 18 (2): 151-60.

Corley, Donald. 1961. Effect of irrigation diversions on smolt out-migrations in the Lemhi River, Idaho. M.S. Thesis, U of I.

Gebhards, Stacy. 1959. The effects of irrigation on the natural production of chinook salmon (*oncorhynchus tshawytscha*) in the Lemhi River. M.S. Thesis, Utah State Univ.

Keifenheim. M. 1992. USFS - Region 4 Salmon National Forest Level 1 Stream Diversion Inventory. In cooperation with IDFG and BLM-Salmon District.

Kiefer, Russel and Lockhart, J. 1994. Intensive evaluation and monitoring of chinook salmon and steelhead trout production. Crooked River and Upper Salmon River sites. U.S. Dept. of Energy, BPA, No. 91-73.

Munther, Gregory. 1973. unpublished USFS Program Rpt.

Spindler, John C. 1955. Loss of game fish in relation to physical characteristics of irrigation canal intakes. *Journal of Wildlife Mgt.* 19 (3): 375-82.

Section 8. Relationships to other projects

This project is a cooperative effort of the Idaho Department of Water Resources, IDWS, the Bureau of Reclamation, USBR, the U.S. Forest Service, USFS, the Sawtooth National Recreation Area, SNRA, the Model Watershed Program, the Natural Resource Conservation Service, NRCS, the Shoshone-Bannock Tribes, Bureau of Land Management, BLM and the irrigators in the state of Idaho.

Section 9. Key personnel

(See end of Document for Organization Chart)

Patrick Marcuson, Screen Program Coordinator, Salmon, ID 83467

Summary:

My professional career features a diversity of fisheries science, management, rehabilitation and enhancement and supervisory activity. Besides working with salmon, trout, groundfish, shellfish and warm water fisheries, my experience includes considerable involvement with outdoor recreation, land allocation, planning and environmental protection. I have hired, trained and supervised over 125 technicians, currently supervise up to 30 employees, published a book and worked closely with a diverse array of landusers, agencies and public groups. I worked as a biologist for a board of commercial salmon fishermen in Alaska, for the National Marine Fisheries Service as an observer of the groundfishing fleet, as a biologist and manager for the State of Montana, a fisheries research biologist and program coordinator of the Anadromous Fish Screen Program for the State of Idaho. I owned and operated CRYSTAL OBSERVERS, INC., a certified shellfish and groundfish observer contractor.

Education:

University of Idaho	BS	Zoology - Letters & Science
University of Idaho	MS	Fisheries Management

Professional Accomplishments:

Guided construction of 84 fish screens in irrigation canals.
Initiated and operated successful private business.
Administered employee payrolls, accounting, related duties.
Designed and constructed four (4) fish ladders.
Built two flow-control structures to assist salmon migrations.
Guided construction of a salmon spawning channel.
Simplified passage of salmon through beaver dams.
Planned and constructed numerous remote fish egg incubators.
Established and set up cabins and biological field camps.
Analyzed and monitored several stream channel modifications.

Taught operational techniques for numerous fish weirs I built.
Supervised numerous fish population estimates.
Organized and performed numerous salmon and trout egg takes.
Initiated fish health surveys for two agencies.
Coordinated two lake enrichment programs.
Developed inventory of streams in two large geographic areas.
Pioneered largest alpine lake investigation in USA.
Drafted annual project budgets.
Attended conferences and made numerous oral presentations.
Testified in court on reservations of instream flows.
Trained and supervised 125 technicians, biologists and observers.
Ordered equipment and supplies.
Drafted over 100 scientific reports.
Managed regional fisheries regs, public input and implementation.
Resolved several land water allocation issues.
Promoted land conservation practices with demonstration projects.
Perfected lake stocking in my fish management region.
Monitored and resolved an agricultural stream sediment problem.
Inventoried and studied all golden trout populations in Montana.
Supervised three graduate level research projects.
Negotiated removal of 15 irrigation diversion dams through ditch consolidations.
Coordinated elimination of 4 irrigation diversions through conversion to ground water.

Section 10. Information/technology transfer

Idaho fish screen program hosted the 6th Annual Fish Screen Workshop in September, 1997. Representatives from 5 states, 5 federal agencies and county governments toured many of the projects. At least 3 tours are provided each year for various agencies, irrigators, contractors and various other groups. IDFG is a member of the Fish Oversight Committee and presents technical information.

TABLE OF ORGANIZATION
ANADROMOUS FISH SCREEN PROGRAM
Region 7 Fish Screen Program

Regional Supervisor
Jim Lukens

Program Coordinator
Pat Marcuson - PCN#3178
Rev. 5/16/97

<u>Const. Supv.</u>	<u>Secretary</u>	<u>Bio Aid</u>	<u>Easement Engineers</u>	<u>Specialist</u>
Lynn Stratton, #6020	Kathy Felchle, #3150 Rosanne Lokker, #6608 <u>Receptionist</u> Bev Frye, #9192	Vacant #9391	Lee VanDebogart, #6120 Matt Hightree, #6006 Mike Maffey, #6005 ^{1/} <u>Engr Tech Temp</u> Marc Wotring, #9192 Curtis Dunbar, #9392	Larry Weeks, #3275
<u>Construction</u>		<u>Shop Mechanic^{2/}</u>	<u>Screen Tenders</u>	
Jim Jones, Foreman, #6029 Jim Hardy, UC, #3209 Cal Hanson, UC, #6052 Duane Krings, UC, #6081 Doug Sholes, UC, #6054 Harvey Goddard, UC, #3151 Vern England, Temp, UC, #9392 Doug Chaffin, Temp, UC, #9392		Edgar W. Hayes, #6055	Larry Shanafelt, Supv., #9392 J. Kettenburg, #9392 Carl Hallock, #9392 Fred Hough, #9392 Albert Miller, #9392 Don Philips, #9392 Jay Giampedraglia, #9392 Cooper, Mike, Temp. UC. #9392 Butch Taylor, #9392 Ron Tobias, #9392 Robert Downing, #9392	
	William Soristo, #9392			

^{1/} Hourly rate by Engineering Bureau charged to Fish Screen Program

^{2/} Supervised by Screen Program but funded by R-7, PCA 61778

All personnel on this register meet or exceed job qualifications of Idaho Department of Fish and Game Engineering Bureau and exceed qualifications for the proposed work.